

Sequence Listing to File.TXT SEQUENCE LISTING

<110>	YOSHINAGA, Takashi ARAI, Toru	
<120>	hERG channel-expressing cell	
<130>	09857/0204372-us0	
<140> <141>		
<150> <151>		
<150> <151>		
<160>	13	
<170>	PatentIn version 3.3	
<210> <211> <212> <213>	4070 DNA	
<220> <221> <222>	CDS (184)(3660)	
<400>	1 gcctg ctcaggcctc cagcggccgg tcggagggaa ggcggggaggc gagcgaggac	60
		120
		180
agg at		228
gac ac Asp Th	cc atc atc cgc aag ttt gag ggc cag agc cgt aag ttc atc atc hr Ile Ile Arg Lys Phe Glu Gly Gln Ser Arg Lys Phe Ile Ile 20 25 30	276
	ac gct cgg gtg gag aac tgc gcc gtc atc tac tgc aac gac ggc sn Ala Arg Val Glu Asn Cys Ala Val Ile Tyr Cys Asn Asp Gly 35 40 45	324
	gc gag ctg tgc ggc tac tcg cgg gcc gag gtg atg cag cga ccc ys Glu Leu Cys Gly Tyr Ser Arg Ala Glu Val Met Gln Arg Pro 50 55 60	372
	hr Cys Asp Phe Leu His Gly Pro Arg Thr Gln Arg Arg Ala Ala	420
gcg ca Ala Gl 80	ag atc gcg cag gca ctg ctg ggc gcc gag gag cgc aaa gtg gaa In Ile Ala Gln Ala Leu Leu Gly Ala Glu Glu Arg Lys Val Glu 85 90 95	468

atc Ile	gcc Ala	ttc Phe	tac Tyr	cgg Arg 100	aaa Lys	gat Asp	aaa	agc	tac	ting ttc Phe	cta	tqt	ctq	gtg	gat Asp	516
gtg Val	gtg Val	ccc Pro	gtg Val 115	aag Lys	aac Asn	gag Glu	gat Asp	ggg Gly 120	gct Ala	gtc Val	atc Ile	atg Met	ttc Phe 125	atc Ile	ctc Leu	564
aat Asn	ttc Phe	gag Glu 130	gtg Val	gtg Val	atg Met	gag Glu	aag Lys 135	gac Asp	atg Met	gtg Val	ggg Gly	tcc Ser 140	ccg Pro	gct Ala	cat His	612
gac Asp	acc Thr 145	aac Asn	cac His	cgg Arg	ggc Gly	ccc Pro 150	ccc Pro	acc Thr	agc Ser	tgg Trp	ctg Leu 155	gcc Ala	cca Pro	ggc Gly	cgc Arg	660
gcc Ala 160	aag Lys	acc Thr	ttc Phe	cgc Arg	ctg Leu 165	aag Lys	ctg Leu	ccc Pro	gcg Ala	ctg Leu 170	ctg Leu	gcg Ala	ctg Leu	acg Thr	gcc Ala 175	708
cgg Arg	gag Glu	tcg Ser	tcg Ser	gtg val 180	cgg Arg	tcg Ser	ggc Gly	ggc Gly	gcg Ala 185	ggc Gly	ggc Gly	gcg Ala	ggc Gly	gcc Ala 190	ccg Pro	756
ggg Gly	gcc Ala	gtg Val	gtg Val 195	gtg Val	gac Asp	gtg Val	gac Asp	ctg Leu 200	acg Thr	ccc Pro	gcg Ala	gca Ala	ccc Pro 205	agc ser	agc Ser	804
gag Glu	tcg Ser	ctg Leu 210	gcc Ala	ctg Leu	gac Asp	gaa Glu	gtg val 215	aca Thr	gcc Ala	atg Met	gac Asp	aac Asn 220	cac His	gtg Val	gca Ala	852
ggg Gly	ctc Leu 225	ggg Gly	ccc Pro	gcg Ala	gag Glu	gag Glu 230	cgg Arg	cgt Arg	gcg Ala	ctg Leu	gtg Val 235	ggt Gly	ccc Pro	ggc Gly	tct Ser	900
ccg Pro 240	ccc Pro	cgc Arg	agc Ser	gcg Ala	ccc Pro 245	ggc Gly	cag Gln	ctc Leu	cca Pro	tcg Ser 250	ccc Pro	cgg Arg	gcg Ala	cac His	agc ser 255	948
ctc Leu	aac Asn	ccc Pro	gac Asp	gcc Ala 260	tcg Ser	ggc Gly	tcc Ser	agc Ser	tgc Cys 265	agc Ser	ctg Leu	gcc Ala	cgg Arg	acg Thr 270	cgc Arg	996
tcc Ser	cga Arg	gaa Glu	agc Ser 275	tgc Cys	gcc Ala	agc Ser	gtg Val	cgc Arg 280	cgc Arg	gcc Ala	tcg Ser	tcg Ser	gcc Ala 285	gac Asp	gac Asp	1044
atc Ile	gag Glu	gcc Ala 290	atg Met	cgc Arg	gcc Ala	ggg Gly	gtg Val 295	ctg Leu	ccc Pro	ccg Pro	cca Pro	ccg Pro 300	cgc Arg	cac His	gcc Ala	1092
agc Ser	acc Thr 305	ggg Gly	gcc Ala	atg Met	cac His	cca Pro 310	ctg Leu	cgc Arg	agc Ser	ggc Gly	ttg Leu 315	ctc Leu	aac Asn	tcc Ser	acc Thr	1140
tcg Ser 320	Asp	tcc Ser	gac Asp	ctc Leu	gtg Val 325	cgc Arg	tac Tyr	cgc Arg	acc Thr	att Ile 330	agc Ser	aag Lys	att Ile	ccc Pro	caa Gln 335	1188
atc Ile	acc Thr	ctc Leu	aac Asn	ttt Phe 340	Val	gac Asp	ctc Leu	aag Lys	Gly 345	gac Asp Page	Pro	ttc Phe	ttg Leu	gct Ala 350	Ser	1236

· .

ccc Pro	acc Thr	agt Ser	gac Asp 355	cgt Arg	gag Glu	atc Ile	ata Ile	gca Ala 360	cct Pro	aag Lys	ata Ile	aag Lys	gag Glu 365	cga Arg	acc Thr	1284
cac His	aat Asn	gtc Val 370	act Thr	gag Glu	aag Lys	gtc Val	acc Thr 375	cag Gln	gtc Val	ctg Leu	tcc Ser	ctg Leu 380	ggc Gly	gcc Ala	gac Asp	1332
gtg Val	ctg Leu 385	cct Pro	gag Glu	tac Tyr	aag Lys	ctg Leu 390	cag Gln	gca Ala	ccg Pro	cgc Arg	atc Ile 395	cac His	cgc Arg	tgg Trp	acc Thr	1380
atc Ile 400	ctg Leu	cat His	tac Tyr	agc Ser	ccc Pro 405	ttc Phe	aag Lys	gcc Ala	gtg Val	tgg Trp 410	gac Asp	tgg Trp	ctc Leu	atc Ile	ctg Leu 415	1428
ctg Leu	ctg Leu	gtc Val	atc Ile	tac Tyr 420	acg Thr	gct Ala	gtc Val	ttc Phe	aca Thr 425	ccc Pro	tac Tyr	tcg Ser	gct Ala	gcc Ala 430	ttc Phe	1476
ctg Leu	ctg Leu	aag Lys	gag Glu 435	acg Thr	gaa Glu	gaa Glu	ggc Gly	ccg Pro 440	cct Pro	gct Ala	acc Thr	gag Glu	tgt Cys 445	ggc Gly	tac Tyr	1524
gcc Ala	tgc Cys	cag Gln 450	ccg Pro	ctg Leu	gct Ala	gtg Val	gtg Val 455	gac Asp	ctc Leu	atc Ile	gtg Val	gac Asp 460	atc Ile	atg Met	ttc Phe	1572
att Ile	gtg Val 465	gac Asp	atc Ile	ctc Leu	atc Ile	aac Asn 470	ttc Phe	cgc Arg	acc Thr	acc Thr	tac Tyr 475	gtc Val	aat Asn	gcc Ala	aac Asn	1620
gag Glu 480	gag Glu	gtg Val	gtc Val	agc Ser	cac His 485	ccc Pro	ggc Gly	cgc Arg	atc Ile	gcc Ala 490	gtc Val	cac His	tac Tyr	ttc Phe	aag Lys 495	1668
ggc Gly	tgg Trp	ttc Phe	ctc Leu	atc Ile 500	gac Asp	atg Met	gtg Val	gcc Ala	gcc Ala 505	atc Ile	ccc Pro	ttc Phe	gac Asp	ctg Leu 510	ctc Leu	1716
atc Ile	ttc Phe	ggc Gly	tct ser 515	ggc Gly	tct Ser	gag Glu	gag Glu	ctg Leu 520	atc Ile	ggg Gly	ctg Leu	ctg Leu	aag Lys 525	act Thr	gcg Ala	1764
cgg Arg	ctg Leu	ctg Leu 530	cgg Arg	ctg Leu	gtg Val	cgc Arg	gtg Val 535	gcg Ala	cgg Arg	aag Lys	ctg Leu	gat Asp 540	cgc Arg	tac Tyr	tca Ser	1812
gag Glu	tac Tyr 545	ggc Gly	gcg Ala	gcc Ala	gtg Val	ctg Leu 550	ttc Phe	ttg Leu	ctc Leu	atg Met	tgc Cys 555	acc Thr	ttt Phe	gcg Ala	ctc Leu	1860
atc Ile 560	gcg Ala	cac His	tgg Trp	cta Leu	gcc Ala 565	tgc Cys	atc Ile	tgg Trp	tac Tyr	gcc Ala 570	atc Ile	ggc Gly	aac Asn	atg Met	gag Glu 575	1908
					tca Ser											1956
cag Gln	ata Ile	ggc Gly	aaa Lys	ccc Pro	tac Tyr	aac Asn	agc Ser	agc Ser	Gly	ctg Leu Page	Gly	ggc Gly	ccc Pro	tcc Ser	atc Ile	2004

			595					600					605			
aag Lys	gac Asp	aag Lys 610	tat Tyr	gtg val	acg Thr	gcg Ala	ctc Leu 615	tac Tyr	ttc Phe	acc Thr	ttc Phe	agc Ser 620	agc Ser	ctc Leu	acc Thr	2052
	gtg Val 625															2100
ttc Phe 640	tcc Ser	atc Ile	tgc Cys	gtc Val	atg Met 645	ctc Leu	att Ile	ggc Gly	tcc Ser	ctc Leu 650	atg Met	tat Tyr	gct Ala	agc Ser	atc Ile 655	2148
	ggc Gly															2196
cgc Arg	tac Tyr	cac His	aca Thr 675	cag Gln	atg Met	ctg Leu	cgg Arg	gtg Val 680	cgg Arg	gag Glu	ttc Phe	atc Ile	cgc Arg 685	ttc Phe	cac His	2244
cag Gln	atc Ile	ccc Pro 690	aat Asn	ccc Pro	ctg Leu	cgc Arg	cag Gln 695	cgc Arg	ctc Leu	gag Glu	gag Glu	tac Tyr 700	ttc Phe	cag Gln	cac His	2292
	tgg Trp 705															2340
ttc Phe 720	cct Pro	gag Glu	tgc Cys	ctg Leu	cag Gln 725	gct Ala	gac Asp	atc Ile	tgc Cys	ctg Leu 730	cac His	ctg Leu	aac Asn	cgc Arg	tca Ser 735	2388
ctg Leu	ctg Leu	cag Gln	cac His	tgc Cys 740	aaa Lys	ccc Pro	ttc Phe	cga Arg	ggg Gly 745	gcc Ala	acc Thr	aag Lys	ggc Gly	tgc Cys 750	ctt Leu	2436
cgg Arg	gcc Ala	ctg Leu	gcc Ala 755	atg Met	aag Lys	ttc Phe	aag Lys	acc Thr 760	aca Thr	cat His	gca Ala	ccg Pro	cca Pro 765	ggg Gly	gac Asp	2484
	ctg Leu															2532
cgg Arg	ggc Gly 785	tcc Ser	atc Ile	gag Glu	atc Ile	ctg Leu 790	cgg Arg	ggc Gly	gac Asp	gtc Val	gtc Val 795	gtg Val	gcc Ala	atc Ile	ctg Leu	2580
ggg Gly 800	aag Lys	aat Asn	gac Asp	atc Ile	ttt Phe 805	ggg Gly	gag Glu	cct Pro	ctg Leu	aac Asn 810	ctg Leu	tat Tyr	gca Ala	agg Arg	cct Pro 815	2628
	aag Lys															2676
	atc Ile															2724
ttc	tcc	gac	cac	ttc	tgg	tcc	agc	ctg		atc age	_	ttc	aac	ctg	cga	2772

## ASP Thr ASN Met Tie Pro 619 Ser Pro 619 Ser Thr 610 Leu 610 619 ## B85 ## B86 ##	٠																	
## ASP Thr ASN Met Tie Pro 619 Ser Pro 619 Ser Thr 610 Leu 610 619 ## B85 ## B86 ##		Phe	Ser		His	Phe	Trp	Ser	Ser	Leu	e Lis Glu	sting Ile	g to Thr	Phe	e.TX Asn	T Leu	Arg	
gac aag gac ag gag cag cag cag agt agc cag gag gag cag cag gag gag agc cag gag g			Thr					Ğİy					Thr					2820
Asp Lys Asp Thr Glu Gln Pro Gly Glu Val Ser Ala Leu Gly Pro Gly 900 cgg gcg gcg gcg gcg agg ccg agt agc ccg gccg g		Ğİy	ttc Phe	agt Ser	cgg Arg	caa Gln	Arg	aag Lys	cgc Arg	aag Lys	ttg Leu	Ser	ttc Phe	cgc Arg	agg Arg	g cgc g Arg	Thr	2868
Arg Ala Gly Ala Gly Pro Ser Ser Arg Gly Arg Pro Gly Gly Pro Trp 925 ggg gaa agc ccg tcc agt ggc ccc tcc agc cct gag agc agt gag gat 3012 gag ggc cca ggc ccg agc tcc agc ccc tcc agc cct ggg agc agt gag gat 3012 gag ggc cca ggc cgc agc tcc agc ccc ctc cgc ctg gtg ccc ttc tcc glu Gly Pro Gly Arg Ser Ser Ser Pro Leu Arg Leu Val Pro Phe Ser g45 gac ccc agg ccc ccc gga gag ccg ccg ggt ggg gag ccc ctg atg gag gac ccc agg ccc ccc gga gag ccg ccg ggt ggg gag ccc ctg atg gag gac ccc agg ccc ccg gga gag ccg ccg ggt ggg gag ccc ctg atg gag gac tgc gag aag agc agc act tgc aac ccc ctg tca ggc gcc ttc Asp cys Glu Lys Ser Ser Asp Thr cys Asn Pro Leu Ser Gly Ala Phe g80 geg gag gtg tcc aac att ttc agc ttc tgg ggg gac agt cgg ggc cgc gag tac cag gag ctc cct cag tgc gag tac cag gag ctc cct cga tgc gag tac cag gag ctc cct cca gag ccc ccc gac ccc agc ccc gag cag gag ctc ccc gag ccc		gac Asp	aag Lys	gac Asp	acg Thr	Glu	cag Gln	cca Pro	ggg Gly	gag Glu	val	tcg Ser	gcc Ala	ttg Leu	ggg Gly	/ Pro	Gly	2916
gag ggc cca ggc cgc agc tcc agc ccc ctc cgc ctg gtg ccc ttc tcc 3060 glu Glu Fro Gly Arg Ser Ser Pro Leu Arg Leu Val Pro Phe Ser 955 agc ccc agg ccc agg ccc agg ggg gag ccc ctg atg gag 3108 ser Pro Arg Pro Pro Gly Glu Pro Pro Gly Gly Glu Pro Leu Met Glu 970 gag agg agg agg agg agg agg agg ccc ttc Asp Cys Glu Lys Ser Ser Asp Thr Cys Asn Pro Leu Ser Gly Ala Phe 985 ggg ggg gag agg ccg ctg ggg ggg gag ccc ttc Asp Cys Glu Lys Ser Ser Asp Thr Cys Asn Pro Leu Ser Gly Ala Phe 985 ggg ggg gac agt ttc agg ggg gac agg agc agc act ttc agg ggg gac agt cgg ggc cgc ser Gly Val Ser Asn Ile Phe Ser Phe Trp Gly Asp Ser Arg Gly Arg 995 loos for John 1015 loos ggg ggc gac agg ggc ggg ggc ggg ggg ggg		cgg Arg	gcg Ala	ggg Gly	Ala	ggg Gly	ccg Pro	agt Ser	agc Ser	Arg	ggc Gly	cgg Arg	ccg Pro	ggg Gly	Gly	/ Pro	tgg Trp	2964
Glū Gly Pro Gly Arg Ser Ser Ser Pro Leu Arg Leu Val Pro Phe Ser 945 955 3108 965 955 3108 965 965 970 975 976 976 976 976 976 976 976 976 976 976		ggg Gly	gag Glu	Ser	ccg Pro	tcc Ser	agt Ser	ggc Gly	Pro	tcc Ser	agc Ser	cct Pro	gag Glu	Ser	agt Ser	gag Glu	gat Asp	3012
gac tgc gag aag agc agc gac act tgc aac ccc ctg tca ggc gcc ttc Asp Cys Glu Lys Ser Ser Asp Thr Cys Asn Pro Leu Ser Gly Ala Phe 980 tca gga gtg tcc aac att ttc agc ttc tgg ggg gac agt cgg ggc cgc Ser Gly Val Ser Asn Ile Phe Ser Phe 1000 cag tac cag gag ctc cct cga tgc ccc gcc ccc acc ccc agc ctc Gln Tyr Gln 1010 ctc aac atc ccc ctc tcc agc ccg ggt cgg cgg cgc ggc ccc ggg ggc gac Leu Asn Ile Pro Leu Ser Ser Pro 1030 gtg gag agc agg ctg gat gcc ctc cag cgc cag ctc aac agg ctg Val Glu Ser 1040 gag acc cgg ctg gat gcc ctc cag cgc cag ctc aac agg ctg Val Glu Ser 1040 gag acc cgg ctg agt gca gac atg Gln Arg Gln Leu Asn 1055 cag agg cag atg acg ctg gtc ccc gcc act gtc ctg cag ctg Gln Tyr Arg Leu Ser Ala Asp Met 1060 cag agg cag atg acg ctg gtc ccc gcc ccc acc ctg ctg ctg Ala Thr Val Leu Gln 1065 cag agg cag atg acg ctg gtc ccc ccc gcc tac agt gtc gtg acc Gln Arg Gln Met Thr Leu Val Pro Pro Ala Tyr Ser Ala Val Thr		gag Glu	Gly	cca Pro	ggc Gly	cgc Arg	agc Ser	ser	agc Ser	ccc Pro	ctc Leu	cgc Arg	Leu	gtg Val	CCC	ttc Phe	tcc Ser	3060
Asp Cys Glu Lys Ser Ser Asp Thr Cys Asn Pro Leu Ser Gly Ala Phe 980 tca gga gtg tcc aac att ttc agc ttc tgg ggg gac agt cgg ggc cgc 3204 Ser Gly Val Ser Asn Ile Phe Ser Phe Trp Gly Asp Ser Arg Gly Arg 1000 cag tac cag gag ctc cct cga tgc ccc gcc ccc acc ccc agc ctc Gln Tyr Gln Glu Leu Pro Arg Cys Pro Ala Pro Thr Pro Ser Leu 1010 ctc aac atc ccc ctc tcc agc ccg ggt cgg cgg ccc cgg ggc gac Leu Asn Ile Pro Leu Ser Ser Pro Gly Arg Arg Pro Arg Gly Asp 1025 gtg gag agc agg ctg gat gcc ctc cag cgc cag ctc aac agg ctg Val Glu Ser Arg Leu Asp Ala Leu 1045 gag acc cgg ctg agt gca gac atg gcc act gtc ctg cag ctg cta Glu Thr Arg Leu Ser Ala Asp Met 1060 cag agg cag atg acg ctg gtc ccg ccc gcc tac agt gct gtg acc Gln Arg Gln Met Thr Leu Val Pro Pro Ala Tyr Ser Ala Val Thr			ccc Pro	agg Arg	ccc Pro	ccc Pro		gag Glu	ccg Pro	ccg Pro	ggt Gly		gag Glu	ccc Pro	ctg Leu	ı atg ı Met		3108
Ser Gly Val Ser Asn Ile Phe Ser Phe Trp Gly Asp Ser Arg Gly Arg 995 cag tac cag gag ctc cct cga tgc ccc gcc ccc acc ccc agc ctc 3249 Gln Tyr Gln Glu Leu Pro Arg Cys Pro Ala Pro Thr Pro Ser Leu 1010 ctc aac atc ccc ctc tcc agc ccg ggt cgg cgg ccc cgg ggc gac Leu Asn Ile Pro Leu Ser Ser Pro Gly Arg Arg Pro Arg Gly Asp 1025 gtg gag agc agg ctg gat gcc ctc cag cgc cag ctc aac agg ctg Val Glu Ser Arg Leu Asp Ala Leu Gln Arg Gln Leu Asn Arg Leu 1040 gag acc cgg ctg agt gca gac atg gcc act gtc ctg cag ctg cta 3384 Glu Thr Arg Leu Ser Ala Asp Met Ala Thr Val Leu Gln Leu Leu 1055 cag agg cag atg acg ctg gtc ccg ccc gcc tac agt gct gtg acc 3429 Gln Arg Gln Met Thr Leu Val Pro Pro Ala Tyr Ser Ala Val Thr						Ser					Asn					/ Āla	Phe	3156
Gln Tyr Gln Glu Leu Pro Arg Cys 1015 Ctc aac atc ccc ctc tcc agc ccg ggt cgg cgg ccc cgg ggc gac Leu Asn Ile 1025 gtg gag agc agg ctg gat gcc ctc cag cgg cgc cag ctc aac agg ctg Arg Leu Asp Ala Leu 1045 gag acc cgg ctg agt gca gac atg gcc act gln Leu Asn Arg Leu Ser Ala Asp Met Ala Thr Val Leu Gln Leu Leu 1065 cag agg cag atg acc ctg gtc ccg ccc gcc tac agt gct gtg acc 3384 Cag agg cag atg acg ctg gtc ccg ccc gcc tac agt gct gtg acc 3429 Gln Arg Gln Met Thr Leu Val Pro Pro Ala Tyr Ser Ala Val Thr		tca Ser	gga Gly	gtg Val	Ser	aac Asn	att Ile	ttc Phe	agc Ser	Phe	Tr	g gg p Gl	g ga y As _l	c ag p Se	r Ar	g G	¥	3204
Leu Asn Ile 1025 Pro Leu Ser Ser Pro 1030 Gly Arg Arg Pro Arg 1035 Gly Asp 1035 gtg gag agc agg ctg gat gcc ctc cag cgc cag ctc aac agg ctg 3339 Val Glu Ser Arg Leu Asp Ala Leu 1045 Gln Arg Gln Leu Asn Arg Leu 1050 gag acc cgg ctg agt gca gac atg gcc act gtc ctg cag ctg cta 1050 Glu Thr Arg Leu Ser Ala Asp Met Ala Thr Val Leu Gln Leu Leu 1065 cag agg cag atg acg ctg gtc ccg ccc gcc tac agt gct gtg acc 3429 Gln Arg Gln Met Thr Leu Val Pro Pro Ala Tyr Ser Ala Val Thr				Gln	Ğ٦i	g cto I Lei	cct Pro	cga Arg	g Cÿ:	s Pi				hr P	ro			3249
Val Glu Ser Arg Leu Asp Ala Leu Gln Arg Gln Leu Asn 1040Arg Leu 1050gag acc cgg ctg agt gca gac atg gcc act gtc ctg cag ctg cta Glu Thr Arg Leu Ser Ala Asp Met Ala Thr Val Leu Gln Leu Leu 10553384cag agg cag atg acg ctg gtc ccg ccc gcc tac agt gct gtg acc Gln Arg Gln Met Thr Leu Val Pro Pro Ala Tyr Ser Ala Val Thr3429		ctc Leu	aac Asn	Ile	Pro	cto Leu	tco Ser	age Sei	r Pro	o G	gt co	gg c rg A	gg co rg P	ro A	rg			3294
Glu Thr Arg Leu Ser Ala Asp Met Ala Thr Val Leu Gln Leu Leu 1055 1060 1065 cag agg cag atg acg ctg gtc ccg ccc gcc tac agt gct gtg acc 3429 Gln Arg Gln Met Thr Leu Val Pro Pro Ala Tyr Ser Ala Val Thr		gtg Val	gag Glu	Ser	Arg	g ctg g Lei	gat I Asp	gco Ala	a Lei	ı G	ag ce In A	gc c rg G	ag c In L	eu A	sn			3339
Glň Arg Glň Met Thr Leu Val Pro Pro Ala Tyr Ser Ala Val Thr		gag Glu	acc Thr	Arg	Lei	g agt u Ser	gca Ala	a gad a Asp	o Me	t A	cc a la Tl	ct g hr V	tc c [.] al L	eu G	1n	ctg Leu		3384
10.0					Met				l Pro) Pi				er A				3429
acc ccg ggg cct ggc ccc act tcc aca tcc ccg ctg ttg ccc gtc Thr Pro Gly Pro Gly Pro Thr Ser Thr Ser Pro Leu Leu Pro Val 1085 1090 1095		acc Thr	ccg Pro	Gly	Pro	ggo Gly	cco Pro	act Thi	r Sei	r Tl	ca to hr So	cc c er P	cg c	eŭ L	eū			3474

agc ccc ctc ccc acc ctc acc ttg Ser Pro Leu Pro Thr Leu Thr Leu 1100 1105	Asp Ser Leu Ser Gln Val Ser	3519
cag ttc atg gcg tgt gag gag ctg Gln Phe Met Ala Cys Glu Glu Leu 1115 1120	Pro Pro Gly Ala Pro Glu Leu	3564
ccc caa gaa ggc ccc aca cga cgc Pro Gln Glu Gly Pro Thr Arg Arg 1130 1135	ctc tcc cta ccg ggc cag ctg Leu Ser Leu Pro Gly Gln Leu 1140	3609
ggg gcc ctc acc tcc cag ccc ctg Gly Ala Leu Thr Ser Gln Pro Leu 1145 1150		3654
ggc agt tagtggggct gcccagtgtg gad Gly Ser	cacgtggc tcacccaggg atcaaggcgc	3710
tgctgggccg ctccccttgg aggccctgct	caggaggccc tgaccgtgga aggggagagg	3770
aactcgaaag cacagctcct cccccagccc	ttgggaccat cttctcctgc agtcccctgg	3830
gccccagtga gaggggcagg ggcagggccg	gcagtaggtg gggcctgtgg tcccccact	3890
gccctgaggg cattagctgg tctaactgcc	cggaggcacc cggccctggg ccttaggcac	3950
ctcaaggact tttctgctat ttactgctct	tattgttaag gataataatt aaggatcata	4010
tgaataatta atgaagatgc tgatgactat	gaataataaa taattatcct gaggagaaaa	4070

<210> 2

<211> 1159

<212> PRT

<213> Homo Sapiens

<400> 2

Met Pro Val Arg Arg Gly His Val Ala Pro Gln Asn Thr Phe Leu Asp 1 10 15

Thr Ile Ile Arg Lys Phe Glu Gly Gln Ser Arg Lys Phe Ile Ile Ala $20 \hspace{1cm} 25 \hspace{1cm} 30$

Asn Ala Arg Val Glu Asn Cys Ala Val Ile Tyr Cys Asn Asp Gly Phe 35 40 45

Cys Glu Leu Cys Gly Tyr Ser Arg Ala Glu Val Met Gln Arg Pro Cys 50 60

Thr Cys Asp Phe Leu His Gly Pro Arg Thr Gln Arg Arg Ala Ala 65 70 75 80

Gln Ile Ala Gln Ala Leu Leu Gly Ala Glu Glu Arg Lys Val Glu Ile $85 \hspace{1cm} 90 \hspace{1cm} 95$.

Page 7

Ala Phe Tyr Arg Lys Asp Gly Ser Cys Phe Leu Cys Leu Val Asp Val 100 105 110 Val Pro Val Lys Asn Glu Asp Gly Ala Val Ile Met Phe Ile Leu Asn 115 120 125 Phe Glu Val Val Met Glu Lys Asp Met Val Gly Ser Pro Ala His Asp 130 135 140 Thr Asn His Arg Gly Pro Pro Thr Ser Trp Leu Ala Pro Gly Arg Ala Lys Thr Phe Arg Leu Lys Leu Pro Ala Leu Leu Ala Leu Thr Ala Arg Glu Ser Ser Val Arg Ser Gly Gly Ala Gly Ala Gly Ala Pro Gly Ala Val Val Asp Val Asp Leu Thr Pro Ala Ala Pro Ser Ser Glu Ser Leu Ala Leu Asp Glu Val Thr Ala Met Asp Asn His Val Ala Gly Leu Gly Pro Ala Glu Glu Arg Arg Ala Leu Val Gly Pro Gly Ser Pro Pro Arg Ser Ala Pro Gly Gln Leu Pro Ser Pro Arg Ala His Ser Leu 245 250 255 Asn Pro Asp Ala Ser Gly Ser Ser Cys Ser Leu Ala Arg Thr Arg Ser 260 265 270 Arg Glu Ser Cys Ala Ser Val Arg Arg Ala Ser Ser Ala Asp Asp Ile 275 280 285 Glu Ala Met Arg Ala Gly Val Leu Pro Pro Pro Pro Arg His Ala Ser 290 Thr Gly Ala Met His Pro Leu Arg Ser Gly Leu Leu Asn Ser Thr Ser Asp Ser Asp Leu Val Arg Tyr Arg Thr Ile Ser Lys Ile Pro Gln Ile 325 330 335 Thr Leu Asn Phe Val Asp Leu Lys Gly Asp Pro Phe Leu Ala Ser Pro 340 345 350

Thr Ser Asp Arg Glu Ile Ile Ala Pro Lys Ile Lys Glu Arg Thr His 355 360 365 Asn Val Thr Glu Lys Val Thr Gln Val Leu Ser Leu Gly Ala Asp Val 370 375 380 Leu Pro Glu Tyr Lys Leu Gln Ala Pro Arg Ile His Arg Trp Thr Ile 385 390 395 400 Leu His Tyr Ser Pro Phe Lys Ala Val Trp Asp Trp Leu Ile Leu Leu 405 410 415 Leu Val Ile Tyr Thr Ala Val Phe Thr Pro Tyr Ser Ala Ala Phe Leu 420 425 430 Leu Lys Glu Thr Glu Glu Gly Pro Pro Ala Thr Glu Cys Gly Tyr Ala 435 440 445 Cys Gln Pro Leu Ala Val Val Asp Leu Ile Val Asp Ile Met Phe Ile 450 460 Val Asp Ile Leu Ile Asn Phe Arg Thr Thr Tyr Val Asn Ala Asn Glu 465 470 475 480 Glu Val Val Ser His Pro Gly Arg Ile Ala Val His Tyr Phe Lys Gly 485 490 495 Trp Phe Leu Ile Asp Met Val Ala Ala Ile Pro Phe Asp Leu Leu Ile 500 510 Phe Gly Ser Gly Ser Glu Glu Leu Ile Gly Leu Leu Lys Thr Ala Arg 515 520 525 Leu Leu Arg Leu Val Arg Val Ala Arg Lys Leu Asp Arg Tyr Ser Glu 530 540 Tyr Gly Ala Ala Val Leu Phe Leu Leu Met Cys Thr Phe Ala Leu Ile 545 550 555 560 Ala His Trp Leu Ala Cys Ile Trp Tyr Ala Ile Gly Asn Met Glu Gln 565 570 575 Pro His Met Asp Ser Arg Ile Gly Trp Leu His Asn Leu Gly Asp Gln 580 585 Ile Gly Lys Pro Tyr Asn Ser Ser Gly Leu Gly Gly Pro Ser Ile Lys

Asp Lys Tyr Val Thr Ala Leu Tyr Phe Thr Phe Ser Ser Leu Thr Ser 610 620 Val Gly Phe Gly Asn Val Ser Pro Asn Thr Asn Ser Glu Lys Ile Phe 630 Ser Ile Cys Val Met Leu Ile Gly Ser Leu Met Tyr Ala Ser Ile Phe 645 650 655 Gly Asn Val Ser Ala Ile Ile Gln Arg Leu Tyr Ser Gly Thr Ala Arg 660 665 670 Tyr His Thr Gln Met Leu Arg Val Arg Glu Phe Ile Arg Phe His Gln 675 680 685 Ile Pro Asn Pro Leu Arg Gln Arg Leu Glu Glu Tyr Phe Gln His Ala 690 695 700 Trp Ser Tyr Thr Asn Gly Ile Asp Met Asn Ala Val Leu Lys Gly Phe 705 710 715 720 Pro Glu Cys Leu Gln Ala Asp Ile Cys Leu His Leu Asn Arg Ser Leu 725 730 735 Leu Gln His Cys Lys Pro Phe Arg Gly Ala Thr Lys Gly Cys Leu Arg 740 745 750 Ala Leu Ala Met Lys Phe Lys Thr Thr His Ala Pro Pro Gly Asp Thr 755 760 765 Leu Val His Ala Gly Asp Leu Leu Thr Ala Leu Tyr Phe Ile Ser Arg 770 775 780 Gly Ser Ile Glu Ile Leu Arg Gly Asp Val Val Ala Ile Leu Gly 785 790 795 800 Lys Asn Asp Ile Phe Gly Glu Pro Leu Asn Leu Tyr Ala Arg Pro Gly Lys Ser Asn Gly Asp Val Arg Ala Leu Thr Tyr Cys Asp Leu His Lys 820 825 830 Ile His Arg Asp Asp Leu Leu Glu Val Leu Asp Met Tyr Pro Glu Phe 835 840 845

Ser	Asp 850	His	Phe	Тгр	Ser	Ser 855	Leu	Glu	Ile	Thr	Phe 860	Asn	Leu	Arg	Asp
Thr 865	Asn	Met	Ile	Pro	Gly 870	Ser	Pro	Gly	Ser	Thr 875	Glu	Leu	Glu	Gly	Gly 880
Phe	Ser	Arg	Gln	Arg 885	Lys	Arg	Lys	Leu	Ser 890	Phe	Arg	Arg	Arg	Thr 895	Asp
Lys	Asp	Thr	G]u 900	Gln	Pro	Gly	Glu	va1 905	Ser	Ala	Leu	Gly	Pro 910	Gly	Arg
Ala	Gly	Ala 915	Gly	Pro	Ser	Ser	Arg 920	Gly	Arg	Pro	Gly	G]y 925	Pro	Trp	Gly
Glu	Ser 930	Pro	Ser	Ser	Gly	Pro 935	Ser	Ser	Pro	Glu	Ser 940	Ser	Glu	Asp	Glu
Gly 945	Pro	Gly	Arg	Ser	Ser 950	Ser	Pro	Leu	Arg	Leu 955	val	Pro	Phe	Ser	Ser 960
Pro	Arg	Pro	Pro	Gly 965	Glu	Pro	Pro	Gly	Gly 970	Glu	Pro	Leu	Met	Glu 975	Asp
Cys	Glu	Lys	Ser 980	Ser	Asp	Thr	Cys	Asn 985	Pro	Leu	Ser	Gly	Ala 990	Phe	Ser
Gly	٧a٦	Ser 995	Asn	Ile	Phe	Ser	Phe 100		p Gly	y As _l	o Se	r Ar		ly A	rg Gln
Туг	Gln 1010		ı Lei	ı Pro	o Arg	10:	s Pi 15	ro A	la Pi	ro Tl	nr P 1	ro 020	Ser I	Leu I	Leu
Asn	Ile 102		o Lei	ı Sei	r Ser	Pro 10	o G 30	ју а	rg A	rg P		rg (035	Gly /	۹sp ۱	val
Glu	Ser 1040		g Lei	ı Ası	o Ala	Lei 10		ln A	rg G	ln L∈		sn 050	Arg I	Leu (Glu
Thr	Arg 105		u Sei	r Ala	a Asp	Me ¹		la т∣	hr Va	al L		1n 065	Leu 1	Leu (Gln
Arg	Gln 1070		t Th	r Lei	u Val	Pro 10		ro A	la T	yr S		1a 080	val ⁻	Thr '	Thr
Pro	Gly 108		o Gly	y Pro	o Thr	Se 10		hr S	er P	ro L		eu 095	Pro ۱	∨al:	Ser

Sequence Listing to File.TXT Pro Leu Pro Thr Leu Thr Leu Asp Ser Leu Ser Gln Val Ser Gln 1100 Phe Met Ala Cys Glu Glu Leu Pro Pro Gly Ala Pro Glu Leu Pro 1125 Gln Glu Gly Pro Thr Arg Arg Leu Ser Leu Pro Gly Gln Leu Gly 1130

Ala Leu Thr Ser Gln Pro Leu His Arg His Gly Ser Asp Pro Gly 1145 1150 1155

Ser

```
<210> 3
<211> 31
<212> DNA
<213> Artificial
<220>
<223> primer
<400> 3
                                                                                      31
aattggtacc atgggctcag gatgccggtg c
<210> 4
<211> 21
<212> DNA
<213> Artificial
<220>
<223> primer
<400> 4
                                                                                      21
gcttgtactc aggcagcacg t
<210> 5
<211> 21
<212> DNA
<213> Artificial
<220>
<223> primer
<400> 5
```

21

<220> Page 11

ccaccagtga ccgtgagatc a

<210> 6 <211> 21 <212> DNA

<213> Artificial

Sequence Listing to File.TXT <223> primer <400> 6 21 ttgcagtgct gcagcagtga g <210> 7 <211> 21 <212> DNA <213> Artificial <220> <223> primer <400> 7 21 atgctagcat cttcggcaac g <210> 31 <211> <212> DNA <213> Artificial <220> <223> primer <400> 8 31 aattaagctt tttcgagttc ctctcccctt c <210> 9 <211> 52 <212> DNA <213> Artificial <220> <223> oligo DNA <400> 9 gatcccccgg gctgcaggaa ttcgatatcg ttaacgtcga cctcgagggt ac 52 <210> 10 <211> 44 <212> DNA <213> Artificial <220> <223> oligo DNA cctcgaggtc gacgttaacg atatcgaatt cctgcagccc gggg 44 <210> 11 <211> 32

<212> DNA

<223> primer

<400> 11

<220>

<213> Artificial

Sequence Listing to File.TXT gtcgtcatcg atacaaatgg cagtattcat cc	32
<210> 12 <211> 34 <212> DNA <213> Artificial	
<220> <223> primer	
<400> 12 gtcgtcaagc ttccaaactg gatctctgct gtcc	34
<210> 13 <211> 5020 <212> DNA <213> Retroviral provirus	
<400> 13 ctgcagcctg aatatgggcc aaacaggata tctgtggtaa gcagttcctg ccccggctca	a 60
gggccaagaa cagatggaac agctgaatat gggccaaaca ggatatctgt ggtaagcag	120
tcctgccccg gctcagggcc aagaacagat ggtccccaga tgcggtccag ccctcagca	180
tttctagaga accatcagat gtttccaggg tgccccaagg acctgaaatg accctgtgc	240
ttatttgaac taaccaatca gttcgcttct cgcttctgtt cgcgcgcttc tgctccccg	a 300
gctcaataaa agagcccaca acccctcact cggggcgcca gtcctccgat tgactgagt	360
gcccgggtac ccgtgtatcc aataaaccct cttgcagttg catccgactt gtggtctcg	420
tgttccttgg gagggtctcc tctgagtgat tgactacccg tcagcggggg tctttcatt	480
gggggctcgt ccgggatcgg gagacccctg cccagggacc accgacccac caccgggag	540
taagctggcc agcaacttat ctgtgtctgt ccgattgtct agtgtctatg actgatttt	a 600
tgcgcctgcg tcggtactag ttagctaact agctctgtat ctggcggacc cgtggtgga	a 660
ctgacgagtt ctgaacaccc ggccgcaacc ctgggagacg tcccagggac tttgggggc	720
gtttttgtgg cccgacctga ggaagggagt cgatgtggaa tccgaccccg tcaggatat	780
tggttctggt aggagacgag aacctaaaac agttcccgcc tccgtctgaa tttttgctt	840
cggtttggaa ccgaagccgc gcgtcttgtc tgctgcagca tcgttctgtg ttgtctctg	900
ctgactgtgt ttctgtattt gtctgaaaat tagggccaga ctgttaccac tcccttaag	960
ttgaccttag atcactggaa agatgtcgag cggctcgctc acaaccagtc ggtagatgt	1020
aagaagagac gttgggttac cttctgctct gcagaatggc caacctttaa cgtcggatg	1080
ccgcgagacg gcacctttaa ccgagacctc atcacccagg ttaagatcaa ggtcttttc	a 1140
cctggcccgc atggacaccc agaccaggtc ccctacatcg tgacctggga agccttggc	1200
tttgaccccc ctccctgggt caagcccttt gtacacccta agcctccgcc tcctcttct	1260

ccatccgcgc	cgtctctccc	ccttgaacct	cctctttcga			1320
tatccagccc	tcactccttc	tctaggcgcc	ggccggatcc	cagtgtggtg	gtacgtagga	1380
attcgccagc	acagtggtcg	acctgtggaa	tgtgtgtcag	ttagggtgtg	gaaagtcccc	1440
aggctcccca	gcaggcagaa	gtatgcaaag	catgcatctc	aattagtcag	caaccaggtg	1500
tggaaagtcc	ccaggctccc	cagcaggcag	aagtatgcaa	agcatgcatc	tcaattagtc	1560
agcaaccata	gtcccgcccc	taactccgcc	catcccgccc	ctaactccgc	ccagttccgc	1620
ccattctccg	ccccatggct	gactaatttt	ttttatttat	gcagaggccg	aggccgcctc	1680
ggcctctgag	ctattccaga	agtagtgagg	aggctttttt	ggaggcctag	gcttttgcaa	1740
acgctgcttg	aggctgaagg	tgcgttgctg	gcgtttttcc	ataggctccg	ccccctgac	1800
gagcatcaca	aaaatcgacg	ctcaagtcag	aggtggcgaa	acccgacagg	actataaaga	1860
taccaggcgt	ttcccctgg	aagctccctc	gtgcgctctc	ctgttccgac	cctgccgctt	1920
accggatacc	tgtccgcctt	tctcccttcg	ggaagcgtgg	cgctttctca	tagctcacgc	1980
tgtaggtatc	tcagttcggt	gtaggtcgtt	cgctccaagc	tgggctgtgt	gcacgaaccc	2040
cccgttcagc	ccgaccgctg	cgccttatcc	ggtaactatc	gtcttgagtc	caacccggta	2100
agacacgact	tatcgccact	ggcagcagcc	actggtaaca	ggattagcag	agcgaggtat	2160
gtaggcggtg	ctacagagtt	cttgaagtgg	tggcctaact	acggctacac	tagaaggaca	2220
gtatttggta	tctgcgctct	gctgaagcca	gttaccttcg	gaaaaagagt	tggtagctct	2280
tgatccggca	aacaaaccac	cgctggtagc	ggtggttttt	ttgtttgcaa	gcagcagatt	2340
acgatcgata	aaataaaaga	ttttatttag	tctccagaaa	aaggggggaa	tgaaagaccc	2400
cacctgtagg	tttggcaagc	tagcttaagt	aacgccattt	tgcaaggcat	ggaaaaatac	2460
ataactgaga	atagagaagt	tcagatcaag	gtcaggaaca	gatggaacag	ctgaatatgg	2520
gccaaacagg	atatctgtgg	taagcagttc	ctgccccggc	tcagggccaa	gaacagatgg	2580
aacagctgaa	tatgggccaa	acaggatatc	tgtggtaagc	agttcctgcc	ccggctcagg	2640
gccaagaaca	gatggtcccc	agatgcggtc	cagccctcag	cagtttctag	agaaccatca	2700
gatgtttcca	gggtgcccca	aggacctgaa	atgaccctgt	gccttatttg	aactaaccaa	2760
tcagttcgct	tctcgcttct	gttcgcgcgc	ttctgctccc	cgagctcaat	aaaagagccc	2820
acaacccctc	actcggggcg	ccagtcctcc	gattgactga	gtcgcccggg	tacccgtgta	2880
tccaataaac	cctcttgcag	ttgcatccga	cttgtggtct	cgctgttcct	tgggagggtc	2940
tcctctgagt	gattgactac	ccgtcagcgg	gggtctttca	catgcagcat	gtatcaaaat	3000
taatttggtt	ttttttctta	agtatttaca	ttaaatggcc	atagttgcat	taatgaatcg	3060
gccaacgcgc	ggggagaggc	ggtttgcgta	ttgggcgctc	ttccgcttcc	tcgctcactg	3120
actcgctgcg	ctcggtcgtt	cggctgcggc	gagcggtatc Page	agctcactca 14	aaggcggtaa	3180

tacggttatc	cacagaatca	ggggataacg	caggaaagaa	catgtgagca	aaaggccagc	3240
aaaaggccag	gaaccgtaaa	aaggccgcgt	tgctggcgtt	tttccatagg	ctccgccccc	3300
ctgacgagca	tcacaaaaat	cgacgctcaa	gtcagaggtg	gcgaaacccg	acaggactat	3360
aaagatacca	ggcgtttccc	cctggaagct	ccctcgtgcg	ctctcctgtt	ccgaccctgc	3420
cgcttaccgg	atacctgtcc	gcctttctcc	cttcgggaag	cgtggcgctt	tctcatagct	3480
cacgctgtag	gtatctcagt	tcggtgtagg	tcgttcgctc	caagctgggc	tgtgtgcacg	3540
aacccccgt	tcagcccgac	cgctgcgcct	tatccggtaa	ctatcgtctt	gagtccaacc	3600
cggtaagaca	cgacttatcg	ccactggcag	cagccactgg	taacaggatt	agcagagcga	3660
ggtatgtagg	cggtgctaca	gagttcttga	agtggtggcc	taactacggc	tacactagaa	3720
ggacagtatt	tggtatctgc	gctctgctga	agccagttac	cttcggaaaa	agagttggta	3780
gctcttgatc	cggcaaacaa	accaccgctg	gtagcggtgg	tttttttgtt	tgcaagcagc	3840
agattacgcg	cagaaaaaaa	ggatctcaag	aagatccttt	gatcttttct	acggggtctg	3900
acgctcagtg	gaacgaaaac	tcacgttaag	ggattttggt	catgagatta	tcaaaaagga	3960
tcttcaccta	gatcctttta	aattaaaaat	gaagtttgcg	gccgcaaatc	aatctaaagt	4020
atatatgagt	aaacttggtc	tgacagttac	caatgcttaa	tcagtgaggc	acctatctca	4080
gcgatctgtc	tatttcgttc	atccatagtt	gcctgactcc	ccgtcgtgta	gataactacg	4140
atacgggagg	gcttaccatc	tggccccagt	gctgcaatga	taccgcgaga	cccacgctca	4200
ccggctccag	atttatcagc	aataaaccag	ccagccggaa	gggccgagcg	cagaagtggt	4260
cctgcaactt	tatccgcctc	catccagtct	attaattgtt	gccgggaagc	tagagtaagt	4320
agttcgccag	ttaatagttt	gcgcaacgtt	gttgccattg	ctacaggcat	cgtggtgtca	4380
cgctcgtcgt	ttggtatggc	ttcattcagc	tccggttccc	aacgatcaag	gcgagttaca	4440
tgatccccca	tgttgtgcaa	aaaagcggtt	agctccttcg	gtcctccgat	cgttgtcaga	4500
agtaagttgg	ccgcagtgtt	atcactcatg	gttatggcag	cactgcataa	ttctcttact	4560
gtcatgccat	ccgtaagatg	cttttctgtg	actggtgagt	actcaaccaa	gtcattctga	4620
gaatagtgta	tgcggcgacc	gagttgctct	tgcccggcgt	caacacggga	taataccgcg	4680
ccacatagca	gaactttaaa	agtgctcatc	attggaaaac	gttcttcggg	gcgaaaactc	4740
tcaaggatct	taccgctgtt	gagatccagt	tcgatgtaac	ccactcgtgc	acccaactga	4800
tcttcagcat	cttttacttt	caccagcgtt	tctgggtgag	caaaaacagg	aaggcaaaat	4860
gccgcaaaaa	agggaataag	ggcgacacgg	aaatgttgaa	tactcatact	cttccttttt	4920
caatattatt	gaagcattta	tcagggttat	tgtctcatga	gcggatacat	atttgaatgt	4980
atttagaaaa	ataaacaaat	aggggttccg	cgcacatttc			5020